Walchand College of Engineering

(Government Aided Autonomous Institute)

Vishrambag, Sangli-416415

Syllabus

S. Y. M. Tech.
Construction Management
Sem-III and IV

With Effect from:

Academic Year

2025-26

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2025-26 onwards

Course Information

Programme	M. Tech. Construction Management
Class, Semester	Second Year M. Tech., Semester III
Course Code	1CM691
Course Name	Dissertation Phase I
Desired Requisites:	Core courses in Construction Management

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	24Hrs./Week	**Credits: 12**			

Course Objectives

1	Provide in-depth knowledge to tackle real world problems of societal concerns.
2	To impart knowledge for establishing objectives by carrying out extensive literature review on selected dissertation topics.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	**Complete** detailed literature survey to understand research developments and set up research hypotheses.	Applying	III
CO2	**Formulate** the objectives of the dissertation based on the scope of work in the area of study.	Creating	VI
CO3	**Develop** the methodology to achieve the objectives of work.	Creating	VI
CO4	**Design and Execute** analytical/Experimental work to achieve the objectives after the study	Applying	III

Module Contents

The dissertation work will start in semester III, and should involve scientific research, design, collection, and analysis of data, determining solutions and must bring out the individual's contribution. Dissertation Phase 1 will have presentation and report submission. The presentation will include identification of the research problem based on the extensive literature review on the topic referring to latest literature available, defining objectives of the work, and the methodology to be adopted.

LA-I is based on the efforts by the student for synopsis preparation. It shall be evaluated using the parameters extent of literature review, scope defined, objectives, fundamental concepts, quality of presentation, and interaction during presentation, effort/work done, quality of report and interaction with guide.

LAI shall be conducted by Departmental Post-Graduate Committee (DPGC)

LA-II is based on the progress made during the semester for the objectives defined in the synopsis and the report submitted by the students. It shall be evaluated through progress seminar(s) at the end of the semester.

The parameters for evaluation include extent of work done, results and discussion/publication efforts, quality of presentation, quality of report, interaction during presentation and interaction with guide.

LA II shall be conducted by Departmental Post-Graduate Committee (DPGC)
ESE will have end semester presentation. End semester presentation will include the validation work and completion of nearly half the work defined for the dissertation. The literature review should continue to study the latest research material available in the chosen field. The external examiner should assess the work done by the individual student based on the detailed report on identification of topic for the work, the methodology adopted and presentation followed by viva-voce. The parameters for evaluation include results and discussion/publication efforts, quality of presentation, quality of report and interaction during presentation.

ESE shall be conducted at the end of semester by a duly constituted examination panel composed of Chairman, internal examiner (guide) and external examiner.

References	
1	Engineering Management Journal
2	Journal of Information Technology in Construction
3	Engineering, Construction and Architectural Management
4	Automation in Construction
5	Journal of Facilities Management
6	Journal of Modern Project Management
7	Journal of Civil Engineering and Management
8	International Journal of Construction Management
9	International Journal of Project Management
10	Journal of Construction Engineering, Technology & Management
11	Journal of Construction Engineering and Management
12	International Journal of Construction Management
13	Building and Energy (Elsevier)
14	Technical Reports of Professional societies.
15	International and national codes of Practices and Handbooks.
16	Internet sources and Distance Learning.
17	Published Ph.D. and M. Tech Thesis of Reputed Institutes.

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1	3					
CO2			3			1
CO3	3					2
CO4				3		

Prepared by	DAC/ BoS Secretary	Head/ BoS Chairman

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2025-26 onwards

Course Information

Programme	M. Tech. Construction Management
Class, Semester	Second Year M. Tech., Semester IV
Course Code	1CM692
Course Name	Dissertation Phase-II
Desired Requisites:	Dissertation Phase-I

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	34 Hrs./Week	**Credits: 17**			

Course Objectives

1	To analyze/experiment selected research topic further and review, classify and consolidate observations/results based on the detailed analytical/ experimental work.
2	Impart flexibility to the student to have increased control over his/ her learning.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	**Execute** analytical/Experimental work to achieve the remaining objectives	Applying	III
CO2	**Analyse** the findings of the study and the work done.	Analysing	IV
CO3	**Interpret** and **critique** the findings of the study/ work done through dissertation.	Evaluating	V
CO4	**Streamline** and **Defend** the outcomes of the dissertation through self-learning.	Evaluating	V

Module Contents

In this semester it is expected that the student has carried out substantial research work through testing and analysis of results obtained through experimental/analytical study.

LA I is based on the progress made during the semester-IV for the objectives defined in the synopsis and the report submitted by the students. It shall be evaluated through progress seminar(s) at the end of the semester. The parameters for evaluation include extent of work done, results and discussion/publication efforts, quality of presentation, quality of report, interaction during presentation and interaction with guide.

LA1 is based on the work done by the student during fourth semester. It shall be evaluated using the parameters extent of work done after phase III, quality of presentation, interaction during presentation and interaction with guide.

LA1 shall be conducted by Departmental Post-Graduate Committee (DPGC).

LA II is based on the work done during the semester and the report submitted by the students. It shall be evaluated through progress seminar(s) at the end of the semester. The parameters for evaluation include extent of work done, results and discussion/publication efforts, quality of presentation, quality of report, interaction during presentation and interaction with guide.

The research paper based on the completed work through five phases should be drafted and submitted to respective guide or communicated to reputed journal or conference.

LA2 shall be conducted by Departmental Post-Graduate Committee (DPGC).

ESE will have end semester presentation. End semester presentation will include the validation work and completion of all lf the work defined for the dissertation. The external examiner should assess the work done by the individual student based on the detailed report on identification of topic for the work, the methodology adopted, results and discussions, findings and conclusions of the study and presentation followed by viva-voce. The parameters for evaluation include results and discussion/publication efforts, quality of presentation, quality of report and interaction during presentation.

ESE shall be conducted at the end of semester by a duly constituted examination panel composed of Chairman, internal examiner (guide) and external examiner.

References	
1	Technical Reports of Professional societies.
2	International and national codes of Practices and Handbooks.
3	Internet sources and Distance Learning.
4	Published Ph.D. and M. Tech Thesis of Reputed Institutes.

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1				3		
CO2				3	2	
CO3		3	3		2	
CO4					3	

Prepared by	DAC/ BoS Secretary	Head/ BoS Chairman

Walchand College of Engineering, Sangli

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AY 2025-26 onwards

Course Information

Programme	M. Tech. Construction Management
Class, Semester	Second Year M. Tech., Semester IV
Course Code	1CM645
Course Name	Internship
Desired Requisites:	Courses taught in semester I and II

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**ESE**	**Total**
Tutorial	-	-	-	100	100
Practical	4 Hrs./Week	**Credits: 2**			

Course Objectives

1	To expose the students to real life engineering problems encountered in industry/society.
2	To provide an opportunity to work in collaborative and multidisciplinary environment.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Description	Blooms Taxonomy	
		Descriptor	Level
CO1	***Perceive*** knowledge of group dynamics and contribute to multidisciplinary work.	Understand	II
CO2	***Demonstrate*** knowledge to solve societal problems and ***apply*** it for efficient management of projects independently and in teams.	Apply	III
CO3	***Communicate*** with industry/society regarding engineering activities effectively and ***comprehend*** and write effective reports.	Understand	II
CO4	***Demonstrate*** ethical behaviour with professional code of conduct and contribute to sustainable development of society.	Apply	III

Contents

The objective of this training is to expose the students to industry environment and practices. Students are sent to leading Engineering organizations/Research laboratories/Design and Consultancy organizations to undergo a rigorous training for a minimum period of **one month** during summer term/vacation.

CO-PO Mapping

	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1					2	
CO2				2		
CO3		2				
CO4					2	

Assessment
The assessment is based on ESE. The panel of minimum two members from the department shall assess the student for the internship. The students are expected to present the work done in an internship tenure. The students shall also submit a detailed report based on activities done in an internship and learnings through the same. The students shall also submit the duly signed internship certificate from the organization/s where internship was done, clearly indicating the period of internship in the certificate.

Prepared by	DAC/ BoS Secretary	Head/ BoS Chairman

Walchand College of Engineering, Sangli

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AY 2025-26 onwards

Course Information

Programme	M. Tech. Construction Management
Class, Semester	Second Year M. Tech., Semester IV
Course Code	1CM646
Course Name	Techno-Socio Activity
Desired Requisites:	-

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**ESE**	**Total**
Tutorial	-	-	-	100	100
Practical	2 Hrs./Week				
Interaction	-	**Credits: 1**			

Course Objectives

1	Develop skills like teamwork, and communication through technical contribution on socio-economic issues
2	Enhance understanding of the socio-economic impact of engineering projects and technology on society.
3	Apply engineering knowledge and problem-solving skills to address real-world challenges

Course Outcomes (CO)

At the end of the course, the students will be able to,

CO	Description	Blooms Taxonomy	
		Descriptor	Level
CO1	***Explain*** professional culture/ethics and build proficiency in professional communication, working in teams, decision making and leadership.	Apply	III
CO2	***Apply*** the technical knowledge through participation in techno-socio assignments.	Apply	III
CO3	***Demonstrate*** ethical quality and social responsibilities through the technical knowledge gained.	Evaluate	V

List of Activities

List of Activities:

1. Involvement in techno-socio activity
   a) Presentation on involvement in techno-socio activity individually/through student clubs during F.Y. & S.Y. M. Tech.
   b) Submission of summary report on these activities.
2. Techno-socio activity (Team Activity)
   a) Organization of a technical activity/event for the benefit of society in a batch.
   b) Submission of report on the organized activity.
3. Submission of certificates/documents required for student port-folio (Participation in Curricular and Extra-Curricular Activities within and outside the campus).

References	
1	National Institute for Engineering Ethics (NIEE)
2	Professional ethics, National Society of Professional Engineers (NSPE).
Useful Links	
1	https://www.asce.org/pdf/ethics_manual.pdf
2	https://www.aicte-india.org/atal

CO-PO Mapping						
	Programme Outcomes (PO)					
	1	2	3	4	5	6
CO1		3			3	
CO2			2		3	
CO3			2		3	

Assessment
The assessment is based on ESE. The panel of minimum two members from the department shall assess the student for the techno-socio activity. The students are expected to present the work done in a four semesters. The students shall also submit a detailed report based on activities done and learnings through the same. The students shall also submit the duly signed certificate from the organization/s, local bodies where activities were carried out.

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AY 2025-26 onwards

Course Information	
Programme	M. Tech. (Construction Management)
Class, Semester	Second Year M. Tech. Construction Management
Course Code	
Course Name	Lean Construction Management
Desired Requisites:	NIL

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To explain contemporary management techniques and discuss the issues in the current scenario.
2	To apply the basics of lean management principles and understand their evolution.
3	To analyse and apply lean construction techniques in design, modelling, and sustainability of construction projects.

Course Outcomes (CO)

CO	Description	Blooms Taxonomy	
		Descriptor	Level
CO1	Explains the contemporary management techniques and the issues in present scenario.	Understanding	II
CO2	Apply the basics of lean management principles and their evolution.	Analysing	IV
CO3	Analyse lean construction techniques in design and modelling.	Applying	III
CO4	Apply lean techniques to achieve sustainability in construction projects	Applying	III

Module	**Module Contents**	**Hours**
I	**Lean Thinking** Introduction to lean concepts and core concepts in lean thinking, Productivity measurements. Essential features of contemporary construction management techniques, Problems with current construction management techniques.	6
II	**Lean Management** Introduction to lean management–Toyota's management principle-Evolution of lean in construction industry-Production theories in construction–Lean construction value-Value in construction-Target value design–Lean project delivery system-Forms of waste in construction industry–Waste Elimination.	7
III	**Lean Tools in Construction** Work Sampling, process charts, foreman delay survey, Last Planner System, Value stream mapping, 5S, case studies.	6
IV	**Lean Integration** Lean Construction and safety, Lean Construction and sustainable development, Lean and Green, Issues in lean implementation in the construction industry, case studies.	6
V	**Lean Construction Implementation** Lean construction implementation-Enabling lean through information technology–Lean in design Structure Matrix Location Based Management System.	7

VI	**Sustainable construction practices** Environmental considerations in project management - green building certifications and standards - life cycle assessment and sustainable procurement.	7

Text Books	
1	Corfe, C. and Clip, B., Implementing lean in construction: Lean and the sustainability agenda.
2	Shang Gao and Sui PhengLow, Lean Construction Management: The Toyota Way, Springe.
References	
1	Dave, B., Koskela, L., Kiviniemi, A., Owen, R., and Tzortzopoulos, P,Implementing lean in construction: Lean construction and BIM.
2	Ballard, G., Tommelein, I., Koskela, L. and Howell, G., Lean construction tools and techniques.
3	Salem, O., Solomon, J., Genaidy, A. and Luegring, M., Site implementation and Assessment of Lean Construction Techniques, Lean Construction Journal.
Useful Links	
1	https://www.youtube.com/watch?v=NnlE2mDAmHE&t=21s

CO-PO Mapping						
	Programme Outcomes (PO)					
COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2		3	2	1	2
CO2			2	2		
CO3	1			2	2	
CO4		2			1	
The strength of mapping: - 1: Low, 2: Medium, 3: High						

Assessment

- The assessment is based on MSE, ISE, and ESE.
- MSE shall be typically on modules 1 to 3.
- ISE shall be taken throughout the semester in the form of a teacher's assessment. The mode of assessment can be field visits, assignments, etc., and is expected to map at least one higher-order PO.
- ESE shall be on all modules with around 25-30% weightage on modules 1 to 3 and 70-75% weightage on modules 4 to 6.
- For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed, and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing).

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AY 2025-26 onwards

Course Information

Programme	M. Tech. (Construction Management)
Class, Semester	Second Year M. Tech. Construction Management
Course Code	
Course Name	Green building and Sustainable development
Desired Requisites:	NIL

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
Practical	-				
Interaction	-	**Credits: 3**			

Course Objectives

1	To impart the knowledge of Green Building concepts and various certifications systems along with its associated requirements/importance and benefits.
2	To implement the Green Building principles and technologies to plan and design an energy efficient and sustainable building systems.
3	To explore and understand different aspects of sustainability and emphasis on principles and legislations obligatory to attain Sustainable Development Goals.

Course Outcomes (CO)

CO	Description	Blooms Taxonomy	
		Descriptor	Level
CO1	Understand the concepts of Green Buildings.	Understanding	II
CO2	Understand the aspects related to design of Green Buildings.	Analysing	IV
CO3	Application of Green Building rating systems to certify buildings based on the adopted energy efficient and ecofriendly technologies	Applying	III
CO4	Analyse various aspects of sustainability as a measure of sustainable development	Analysing	IV

Module	Module Contents	Hours
I	**Introduction** Concept of Green Building, need for Green Building, Benefits of Green Buildings, Green Building Materials and Equipment in India, what are key Requisites for Constructing a Green Building, Important Sustainable features for Green Building.	6
II	**Green Building Technologies:** Introduction- Necessity - Concept of Green building. Principles green building - Selection of site and Orientation of the building - usage of low energy materials effective cooling and heating systems - effective electrical systems - effective water conservation systems - Certification systems- Green Rating for Integrated Habitat Assessment (GRIHA) and Leadership in Energy and Environmental Design (LEED), case studies.	7

III	**Green Building Design** Introduction, Reduction in Energy Demand, Onsite Sources and Sinks. Maximize System Efficiency, Steps to Reduce Energy Demand and Use Onsite Sources and Sinks. Use of Renewable Energy Sources. Ecofriendly captive power generation for factory, Building requirement.	6
IV	**Introduction to Sustainable Development** Definition, Brief Historical background of Sustainable Development, Features and Principles of Sustainable Development, Sustainable Development Goals (SDGs), United Nations Global Compact.	6
V	**Aspects of Sustainability Development** Introduction to Sustainability Development, Economic Aspects- Meaning, Ways of Achieving Economic Sustainability, Socio Political Aspects – Meaning, Ways of Achieving Socio Political Sustainability, Ecological (Environmental) Aspects – Meaning, Ways of Achieving Ecological Sustainability	7
VI	**Natural Resources and Sustainable Development** Meaning of Natural Resources, Importance of Natural Resources, Classification of Natural Resources, Natural Resources Utilisation and Sustainable Development, Salient features of Environment Protection Act 1986, Water Act 1974, Air Act 1981.	7

Text Books	
1	Sustainable Building Technologies, Editor: K.S. Jagadish, Published by BMTPC, I.K. International Publishing House Pvt. Ltd.
2	Green Building Through Integrated Design, Jerry Yudelson (2009). New York: McGraw-Hill. https://www.accessengineeringlibrary.com/content/book/9780071546010
3	Green Building towards Sustainable Development, Dr. Dhirendra Kumar Chaudhary, Devendra Dohare, Kalpana R. Thakare (Kawathekar), Mukesh Panneerselvam, Dr. G. Sree Lakshmi Dev, JEC Publication - Business & Economics

References	
1	Sustainable Construction: Green Building Design and Delivery, Charles J. Kibert, Wiley Publications, ISBN: 978-1-119-70645-8
2	"Green Building: Principles & Practices" by Dr. Adv. Harshul Savla
3	Green Building and Sustainable Development: The Practical Legal Guide, By: Jonathan E. Furr, Nicole C. Kilbert, James T. Mayer, Shannon D. Sentman, Jonathan E Furr, Publisher: American Bar Association

Useful Links	
1	https://www.youtube.com/watch?v=pu40uzb0TOY&list=PLyqSpQzTE6M_CTN-yV6o0ZVS4tbrkfwMH
2	https://www.youtube.com/watch?v=oRt0zRuFKC4&list=PLLy_2iUCG87CfjAcR9lGNrJ16Fe6OqXzr

CO-PO Mapping						
	Programme Outcomes (PO)					
COs	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2		3	3	2	2
CO2	1	2		1	1	
CO3	2		2	3		
CO4	2		3			2
The strength of mapping: - 1: Low, 2: Medium, 3: High						

Assessment
The assessment is based on MSE, ISE, and ESE. MSE shall be typically on modules 1 to 3. ISE shall be taken throughout the semester in the form of a teacher's assessment. The mode of assessment can be field visits, assignments, etc., and is expected to map at least one higher-order PO. ESE shall be on all modules with around 25-30% weightage on modules 1 to 3 and 70-75% weightage on modules 4 to 6. For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed, and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing).

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